



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,678	02/24/2006	Joachim Rosker	P29080	8281
7055 7590 04/17/2009 GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191				
EXAMINER D'ANIELLO, NICHOLAS P				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
04/17/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

### Office Action Summary

**Application No.**

10/562,678

**Applicant(s)**

ROSLER ET AL.

**Examiner**

Nicholas P. D'Aniello

**Art Unit**

1793

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,5,7-11,13-15,21,23 and 26-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,7-11,13,14,21,23 and 26-30 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

Claims 29 and 30 have been added. The rejections have been maintained, see the response to arguments.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-8, 10-11 and 16 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Egorova et al. ("Effect of the structure on the cutability of Titanium alloys") in view of Lederich et al. (USP 4,415,375 of record), Smickley et al. (USP 4,505,764 of record), Zwicker et al. (USP 2,892,742 of record) and Fisher et al. (US Patent No. 5,211,775 of record).

In regard to independent claim 1, Egorova et al. teach a method of machining a titanium alloy by performing a "hydrogen charging step" where the work piece is heated in a hydrogen containing atmosphere at a temperature of 750°C (approximately 973K) during which the work piece absorbs the hydrogen. The titanium work piece is then cut (metal-removing machining) and the hydrogen is released by heating the work piece in a vacuum (hydrogen free atmosphere) (see provided document at least the abstract, introduction and methods of study). Although not specifically taught, a cooling step would naturally flow in the process of Egorova et al. since the work piece would be

exposed to a natural cooling as it is removed from the furnace and exposed to an ambient atmosphere (ambient atmosphere is a hydrogen containing atmosphere).

Claim 1 differs from Egorova et al. in calling for a removal of the oxide layers and covering layers from the workpiece. However, it would have been obvious in the art to remove the oxide layers of the titanium work piece prior to heating because Fisher et al. teach a method of removing oxide layers from titanium work pieces (column 2 line 66 – column 3 line 3) because oxygen enriched area form very hard surface layers which low ductility which cause deterioration of strength and other mechanical properties in titanium (column 1, lines 49-52).

Claim 1 differs from Egorova et al. in calling for the hydrogen containing atmosphere to be under a pressure of approximately 5 kPa because the reference is silent regarding this pressure (although it is noted the object is to obtain the same degree of hydrogen absorption (0.5% H in Ti) as applicant, see table 4 of the reference). However, it would have been obvious in the art to use a pressure of around 6.9 kPa because Smickley et al. teach a method of refining the microstructure of titanium by heating the work piece in a hydrogen containing atmosphere where the pressure is kept constant around 1 psi (which converts to roughly 6.9 kPa) (column 9, *Example 1*). Approximately 5 kPa is taken to read on around 6.9 kPa.

In the event that 750°C is not taken to be approximately 973K, claim 1 also differs from Egorova et al. in calling for a specific temperature during the hydrogen charging step, however Lederich et al. teach a similar method for improving the machinability of titanium workpieces by hydrogen charging and the desirability to use

temperatures between 600 and 760°C which prevent grain growth and have the maximum hydrogen solubility (column 3 lines 43-50).

In the event the cooling step is taken to be embraced by Egorova et al., it would have been obvious to include a cooling step in the process of Egorova et al. because Zwicker et al. teach a process for improving the workability of titanium alloys using a similar hydrogen charging process where the hydrogen is later removed where the work piece is allowed to cool in the same oven after the hydrogen charging step prior to the hydrogen removal (column 2, *Example 1*). This is the same method proposed by applicant and is a simple method for insuring the hydrogen does not escape the workpiece due to a concentration gradient during cooling.

Regarding claim 2, Egorova et al. teach that the hydrogen is typically removed by heating the formed part in a vacuum (see introduction).

Regarding claim 5, Egorova et al. teach that the hydrogen charging step (annealing time in hydrogen containing atmosphere) is performed for ten hours prior to forming (page 138, column 1, paragraph 3).

Regarding claim 7, although Egorova et al. is silent regarding a quantitative value of the vacuum pressure it would have been obvious to use a vacuum pressure of least  $2 \cdot 10^{-3}$  Pa because Zwicker et al. teach that the hydrogen is removed under a high vacuum (column 2 lines 46-48).

Regarding claim 8, Egorova et al. teach, in one example, that the annealing temperature in the hydrogen free atmosphere (vacuum annealing) is performed at 800°C (page 138, column 1, paragraph 3).

Regarding claims 10 and 11, Egorova et al. teach that the hydrogen content introduced into the alloy should be between 0.1 and 0.7 weight percent to improve the formability (see table 4).

Regarding claim 13, Fisher et al. teach a method of removing oxide layers from titanium work pieces using an etching solution containing nitric acid ( $\text{HNO}_3$ ) (column 2 line 66 – column 3 line 3)

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Egorova et al., Lederich et al., Smickley et al., Zwicker et al. and Fisher et al. as applied to claim 1 above, and further in view of Garg et al. (US Patent No. 4,902,535 of record).

Egorova et al. in combination teaches the method as presented in independent claim 1. Claim 9 differs from Egorova et al. and Zwicker et al. in calling for the heating to be carried out inductively, whereas the references are silent on the mechanism of heating. However, it would have been obvious in the art to use an inductive furnace because Garg et al. teach a method for depositing coatings on titanium where the work piece is heated in an inductive graphite furnace which has hydrogen containing atmosphere (column 6, *Control 1*).

4. Claim 14 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Egorova et al., Lederich et al., Smickley et al., Zwicker et al. and Fisher et al. as applied to claim 13 above, and further in view of Borowik (US Patent No. 2,974,021 of record).

The combination of references teaches the desirability to etch the oxide layer of a titanium work piece before improving the workability with a hydrogen charging step. Claim 15 differs from the references in calling for a composition comprising water, nitric acid, hydrofluoric acid and hydrogen peroxide for the etching solution. However it would have been obvious in the art to use a solution of hydrofluoric acid, hydrogen peroxide, nitric acid and water could be used because Borowik teach a solution for etching titanium containing 10 parts by volume of 48% C.P. hydrofluoric acid, 60 parts by volume of U.S.P. 3% hydrogen peroxide, 10 parts by volume of commercial 69.3% nitric acid, and 30 parts by volume of distilled water (column 2, claim 1).

5. Claims 21, 23 and 28 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Nagata et al. (USP 5,156,807).

The following is a section from the MPEP 2144.05 concerning the obviousness of ranges: In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); *In re Geisler*, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997) Similarly, a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Nagata et al. teaches a variety of titanium alloys which have improved machinability (abstract), disclosed are several Ti-Al6-V4 alloys in Table 1, for example see alloys number 17, 41 and 42 which contain either 1.53, 2.3 or 2.26 weight percent lanthanum respectively; which converts to approximately .5, .77 or .75 atomic percent lanthanum respectively where the rare earth metals (REM, such as lanthanum) forms inclusions (precipitates) which increases machinability (column 1, lines 51-53).

Nagata et al. forms the alloy by vacuum arc re-melting (VAR) (column 5 lines 54-61) which is similar to applicant (instant specification at page 10 lines 4 and 5) and therefore it is reasonably assumed that the microstructure of the alloy is the same. Additionally, as there is no disclosure of oxygen or nitrogen in these inclusions (precipitates) it is reasonably assumed that they are devoid of oxygen and nitrogen. Due to the laws of thermodynamics, precipitates naturally nucleate at grain boundaries in cast microstructures and the size of the precipitates is a determined by the heat treatment which is well within the purview of one of ordinary skill in the art.

As to claim 23, Ti-Al6-V4 is always an  $\alpha + \beta$  alloys due to the presence of Al and/or V.

In regard to claim 28, although complete precipitation is not specifically disclosed by Nagata et al., the machinability increases with the inclusion/precipitate formation (column 1, lines 51-53) therefore it would have been obvious to completely precipitate the lanthanum in the alloy of Nagata et al. in order to obtain maximum machinability.



6. Claim 26 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Egorova et al. ("Effect of the structure on the cutability of Titanium alloys") in view of Smickley et al. (USP 4,505,764 of record), Zwicker et al. (USP 2,892,742 of record) and Fisher et al. (US Patent No. 5,211,775 of record).

In regard to independent claim 26, Egorova et al. teach a method of machining a titanium alloy by performing a "hydrogen charging step" where the work piece is heated in a hydrogen containing atmosphere at a temperature of at least 750°C during which the work piece absorbs the hydrogen. The titanium work piece is then cut (metal-removing machining) and the hydrogen is released by heating the work piece in a vacuum (hydrogen free atmosphere) (see provided document at least the abstract, introduction and methods of study). Although not specifically taught, a cooling step would naturally flow in the process of Egorova et al. since the work piece would be exposed to a natural cooling as it is removed from the furnace and exposed to an ambient atmosphere (ambient atmosphere is a hydrogen containing atmosphere).

Claim 26 differs from Egorova et al. in calling for a removal of oxide layers from the workpiece. However, it would have been obvious in the art to remove the oxide layers of the titanium work piece prior to heating because Fisher et al. teach a method of removing oxide layers from titanium work pieces using an etching solution containing nitric acid ( $\text{HNO}_3$ ) (column 2 line 66 – column 3 line 3) because oxygen enriched area form very hard surface layers which low ductility which cause deterioration of strength and other mechanical properties in titanium (column 1, lines 49-52).

Claim 26 differs from Egorova et al. in calling for the hydrogen containing atmosphere to be under a pressure of approximately 5 kPa because the reference is silent regarding this pressure (although it is noted the object is to obtain the same degree of hydrogen absorption (0.5% H in Ti) as applicant, see table 4 of the reference). However, it would have been obvious in the art to use a pressure of around 6.9 kPa because Smickley et al. teach a method of refining the microstructure of titanium by heating the work piece in a hydrogen containing atmosphere where the pressure is kept constant around 1 psi (which converts to roughly 6.9 kPa) (column 9, *Example 1*). Approximately 5 kPa is taken to read on around 6.9 kPa. In any event, it would have been obvious to use a pressure of approximately 5 kPa because one in the art would have reasonably expected that substantially the same desired result would be achieved as this is close to the pressure (around 6.9 kPa) taught by Smickley et al.

In the event the cooling step is taken to be embraced by Egorova et al., it would have been obvious to include a cooling step in the process of Egorova et al. because Zwicker et al. teach a process for improving the workability of titanium alloys using a similar hydrogen charging process where the hydrogen is later removed where the work piece is allowed to cool in the same oven after the hydrogen charging step prior to the hydrogen removal (column 2, *Example 1*). This is similar to the method proposed by applicant and is a simple method for insuring the hydrogen does not escape the workpiece due to a concentration gradient during cooling.

7. Claim 27 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Egorova et al., Smickley et al., Zwicker et al. and Fisher et al. as applied to claim 1 above, and further in view of Lederich et al. and Whang et al. (US Patent No. 4,512,826).

Egorova et al. in view of Lederich et al. teach a method for machining Ti-6Al-4V as applied to claim 1 (see column 3 lines 12-14 of Lederich, TiAl6V4 is one of the most commonly used titanium alloys). Claim 27 differs from the references in calling for a Ti-6Al-4V alloy with lanthanum in the content of 0.3 to 15 atomic percent. However, it would have been obvious in the art to include lanthanum because Whang et al. teach a method of precipitation hardening titanium alloys by adding a rare earth element (preferably lanthanum) in the amount of 0.1 to 2.0 atomic percent because it is relatively cheap (column 3 lines 37-43).

8. Claims 29 and 30 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Egorova et al., Smickley et al., Zwicker et al., Fisher et al. and (optionally) Lederich et al. as applied to claim 1 or 26, and further in view of Vordahl (USP 2,974,076).

Egorova et al. show on page 136 in figure 2 the microstructure of the titanium alloys after they have been charged and cut (these sample must be ground flat) and before they are heated in a hydrogen free atmosphere (still contains 0.5% H), however does not specifically mention etching the samples. However, Vordahl teaches titanium

alloys that have been heat treated and the desirability to etch the alloy in order to bring out the microstructure as shown in figures 1-3 (column 7 lines 46-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to etch the sample of Egorova et al. after hydrogen charging and machining and before releasing the hydrogen in order to see the microstructure as taught by Vordahl.

***Allowable Subject Matter***

9. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Although Borowik teaches a solution for etching titanium containing 10 parts by volume of 48% C.P. hydrofluoric acid, 60 parts by volume of U.S.P. 3% hydrogen peroxide, 10 parts by volume of commercial 69.3% nitric acid, and 30 parts by volume of distilled water (column 2, claim 1) this claim distinguishes over the prior art of record by defining the ratio of the components to differ substantially such that one of ordinary skill in the art would not consider the solution an obvious variant. More specifically, the composition in claim 15 requires a much larger concentration of nitric acid and much less hydrogen peroxide and hydrofluoric acid (see table in previous actions).

***Response to Arguments***

Applicant's arguments have been fully considered but they are not persuasive. Specifically, one reading the Egorova reference as a whole would have appreciated that the 800 degree centigrade hydrogen charging temperature is a result effective variable (see table 5) in the process of Egorova and the temperature (800) is not critical to the invention. Conversely, this temperature was merely kept constant in the experiments listed in table 4 to determine the effect different alloy compositions on the structure, keeping temperature constant so the results are comparable. In fact, Egorova teach the cutability of titanium worsens with higher temperatures of hydrogen charging because of the grain coarsening that occurs at higher temperatures (page 137 first paragraph), as seen on page 137 under Table 4 the best cutability was acquired with a hydrogen charging temperature of 750 centigrade, therefore 800 centigrade is obviously not the optimum parameter as asserted by applicant.

The optimum parameter being attained is the amount of hydrogen absorbed into the titanium and the desired level of hydrogen is the same as applicant's (~0.5% H). A fair reading of Egorova would lead one of ordinary skill in the art to adjust the charging temperature based on the particular titanium alloy being used in the machining process. Lederich et al. support this assertion in that the claimed temperature is known to be used for hydrogen charging of similar titanium alloys. In fact, the VT-6 titanium alloy disclosed by Egorova et al. is in fact a Ti-Al6-V4 alloy, this was previously unknown to the Examiner, and one would have appreciated that the particular titanium alloy is not

critical to Egorova et al. as the reference studies a dozen different titanium alloys and their properties regarding hydrogen charging.

In regard to the hydrogen pressure - Smickley et al. teaches a pressure of 1 psi in order to obtain a hydrogen content of 0.8 percent hydrogen into the titanium (column 9 - Example 1). As Egorova is particularly concerned with obtaining a hydrogen content of ~0.5% (depending on the alloy) which is appreciably lower than 0.8% and one of ordinary skill in the art at the time of the invention would have recognized that the hydrogen pressure has a direct result on the amount of hydrogen absorbed by the titanium it would have been obvious to lower this pressure in order to obtain the optimal amount of hydrogen charging. Smickley et al. was cited because none of the other references mention the hydrogen pressure during charging and this reference shows that a pressure on the order of kPa is suitably. In other words, the hydrogen charging pressure can be equated to a result effective variable which would have been determined by routine experimentation.

In regard to cooling in a hydrogen atmosphere and applicant's assertion that the process of Zwicker et al. would not be a hydrogen-containing atmosphere this is not persuasive because a person of ordinary skill in the art giving a **fair reading** to the Zwicker et al. reference would have appreciated that there is no disclosure of modifying the atmosphere in the oven after filling with hydrogen and as the objective of the heating is to trap hydrogen in the workpiece modifying the atmosphere to remove the hydrogen would completely contradict the teachings of the reference. The process described by Zwicker et al. (cooling the same furnace as the hydrogen charging) is similar to

applicant's process of switching the furnace off and leaving the workpiece to its own devices; and therefore it is reasonably assumed the furnace contains hydrogen, absent any evidence to the contrary, because there is no disclosure of modifying the furnace atmosphere. Applicant is adopting an unfair reading of the reference in that because it does not disclose the atmosphere during cooling.

The argument against the assertion that a high vacuum obviates the claimed pressure in the vacuum is not persuasive as selecting a quantitative value for the vacuum is well within the purview of one of ordinary skill in the art, as such, specific vacuum pressure values are not disclosed in the references. A "high vacuum" is a relative term but it has a quantitative meaning in the material processing art, as shown in the attached document "AVS Reference Guide - Glossary" the quantitative value of a high vacuum substantially overlaps the claimed range (see page 9 - definition of vacuum). Applicant has shown no criticality for the range in claim 7 and as this range is open ended and one of ordinary skill would have appreciated that hydrogen embrittles titanium (and therefore makes it easier to machine) and needs to be removed after machining the higher the vacuum the more efficiently hydrogen can be removed.

In regard to claim 9, the assertion that Egorova does not even disclose a TiAl6V4 alloy is untrue, as noted above, it was previously unknown to the Examiner however the VT-6 alloy disclosed by Egorova is in fact a TiAl6V4 alloy. The addition of lanthanum to titanium alloys is obvious in view of Whang as applied above.

In regard to independent claim 21, Whang is not used in the rejection and has been removed from the rejection heading; this was merely a typographical error and the

grounds of rejection have not changed. Although Nagata discloses that oxygen *may* be present or that nitrogen *may* incidentally be included as an impurity in the alloy the reference does not disclose oxygen or nitrogen in the precipitates, although they *may* be present in the alloy. The fact that applicant's process includes removing oxides and a vacuum step does not affect the patentability of this product claim. Nagata teaches that the REM such as lanthanum form inclusions which improve the machinability of titanium (column 1 lines 50-52) and as there is no disclosure of other elements in these inclusions i.e. precipitates these inclusions are taken to be pure lanthanum, absent any evidence to the contrary, where applicant has not provided evidence showing the inclusion/precipitates of Nagata to include oxygen or nitrogen.

In regard to claim 26, the Examiner has corrected the typographical error of leaving Smickley out of the rejection heading; this does not change the grounds of rejection and is no basis for another non-final action. The limitations taught by Smickley were already addressed in independent claim 1 and applicant is well aware of the Smickley reference. The same counter-arguments for the heating temperature, hydrogen pressure and cooling in hydrogen apply to this claim as applied to claim 1 above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Inquiries***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P. D./  
Examiner, Art Unit 1793

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1793